M/045/0008
cc: Leslie
Tom
Lynn
Task 4518

USmag®

US Magnesium LLC
238 North 2200 West - Salt Lake City, UT 84116-2921
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November 28, 2011

Paul Baker
Minerals Program Manager
Utah Division of Oil, Gas and Mining

Re: Requested Revisions to US Magnesium's "Mine and Reclamation Plan" of Oct. 2008

Dear Paul,

I appreciate your patience in waiting for a response to your requested revisions to US Magnesium's "Mine and Reclamation Plan" of Oct. 2008.

The submitted documents include:

- A redline version of a revised plan as requested.
- A spread sheet tracking Utah Division of Oil, Gas and Mining's comments on the submitted plan and US Magnesium's thoughts/responses
- A revised Figure 4.4 (Comment 29)
- A copy of the SPCC plan properly signed by a professional engineer (Comment 30)
- A diagram showing cross sectional dimensions of solar pond dikes (Comment 12)

In working on this project it is clear to me that we need a brief meeting to allow me to properly close all of the UDOGM's comments so this document can be put to bed. The nature of mineral extraction via solar ponds is different than conventional mining. How those regulations should be made to fit needs to be discussed. It should also be noted that the magnesium operation's solar ponds at Rowley have operated for 40 years. The historic circumstances must also be considered in context to the reclamation plan.

I will call your office, to arrange a time to discuss the finalization of this project

Sincerely,

Tom Tripp
Technical Services Manager
US Magnesium LLC
801-433-4068

US MAGNESIUM LLC

MINE AND RECLAMATION PLAN
STANSBURY BASIN / ROWLEY PROJECT

For submittal to:
Utah Division of Oil, Gas, and Mining

~~October 2008~~November 2011 rev.

usmag™

US Magnesium LLC
238 North 2200 West
Salt Lake City, UT 84116-2921

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1.0 INTRODUCTION & PURPOSE

The purpose of this Mine & Reclamation Plan is respond to the request made by the Utah Division of Oil Gas Mining (UDOGM) to provide more in depth information on the US Magnesium LLC (USM) Stansbury/Rowley pond operation. The request was made at a May 29, 2008 meeting during which time UDOGM also provided direction to USM on the format for a revised Mine and Reclamation Plan. At that same meeting USM was advised of the need to increase the reclamation surety for the facility to $421,588.00.

Stansbury/Rowley operations are regulated under Utah Rule R647-4. Large Mining Operations. This Plan has been formatted to address the requirements under that rule.

It should be noted that this submission is not a "Notice of Intention" to commence mining as the Rowley (Tooele County) magnesium operation has in fact been operating for more than 40 years. Rather this document is an attempt to provide information to the Utah Div. of Oil Gas and Mining and the public. This submission is formatted in the style of a "Notice of Intention," but is not subject to public comments per pior understanding with UDOGM.

The Plan includes that following sections: [Numbering in brackets refers to applicable sections of the Utah Code applicable to large mining operations.]

1.0 Introduction & Purpose

2.0 *Background* – A brief overview of the relevant history in regards to past operation and reclamation

3.0 [R647-4-104]~~3.0~~ *Operator(s), Surface and Mineral Owner(s)* – Information that addresses Section 104 of the above-referenced rule.

4.0 [R647-4-105]*Maps, Drawings, and Photographs*– Information that addresses Section 105 of the above-referenced rule.

5.0 [R647-4-106]*Operation Plan* – Information that addresses Section 106 of the above-referenced rule.

6.0 [R647-4-110]*Reclamation Plan Description*– Information that addresses Section 110 of the above-referenced rule.

7.0 [R647-4-109]*Impact Assessment* – Information that addresses Section 109 of the above-referenced rule.

8.0 [R647-4-113]*Surety and Bonding* – A brief overview of ongoing surety and bonding issues for the affected facilities.

In preparing this Mine and Reclamation Plan, USM has also reviewed reclamation issues at the following similar types of operations that treat brine from the Great Salt Lake:

- Morton International

- Cargill Salt
- GSL Minerals
- Intrepid Potash

Where appropriate, the Plan addresses relevant issues that have arisen from these operations where the may apply to USM's Stansbury/Rowley facility.

2.0 BACKGROUND

The USM Stansbury/Rowley pond operations provide concentrated brine from the Great Salt Lake that is subsequently used to produce metallic magnesium and chlorine, as well as other co-products including hydrochloric acid and iron chloride. The facility began operations in 1972 and has undergone a number of ownership changes subsequent to that date. USM assumed ownership of the facility in 2002 after the previous owner the Magnesium Corporation of America (Magcorp) filed for bankruptcy.

Key milestones for the facility that reflect the nature of changes to ownership and reclamation requirements/bonding are as follows:

1968	Solar pond construction and operations begine
1972	Stansbury/Rowley manufacturing pond operations begin. National Lead (NL) is the original owner of the facility.
May 5, 1979	UDOGM approves the NL Mine and Reclamation Plan.
December 28, 1984	UDOGM accepts a bond for the transfer of interests and responsibilities from National Lead to the AMAX Magnesium Corporation.
July 26, 1990	UDOGM approves permit transfer and the form of reclamation sureties as part of the transfer of ownership of the facility from AMAX Magnesium Corporation to Magcorp.
January 6, 2003	UDOGM approves permit transfer, reclamation contract and surety bond documents as part of the transfer of ownership of the facility from Magcorp to US Magnesium LLC (USM).
November, 2003	USM completes reclamation of the Oolitic Sand and Borrow Areas with assistance from UDOGM on soil preparation and seeding.
May 29, 2008	UDOGM meets with USM and directs the company to increase it Reclamation Surety to $421,588.00 and to resubmit a Mine and Reclamation Plan that more closely meet UDOGM requirements.

This Mine and Reclamation Plan is intended to comply with the content and format requirements UDOGM directed USM to follow in revising its Plan.

3.0 [R647-4-104] OPERATOR(S), SURFACE AND MINERAL OWNER(S)

3.1 Operator Information

Requirement

> ***"The name, permanent mailing address, and telephone number of the operator responsible for the mining operations and reclamation of the site."*** **[R647-4-104.1]**

Response:

US Magnesium LLC
238 North 2200 West
Salt Lake City UT 84116
Phone: 801-532-2043

Contact: Tom Tripp

3.2 Surface and Mineral Owners

Requirement

> ***"The name, permanent mailing address, and telephone number of the surface landowner(s) and mineral owner(s) of all land to be affected by the operations."*** **[R647-4-104.2]**

The mining operation is unlike most mining operations in Utah in that minerals are extracted from solar ponds located on land owned by the State of Utah. The minerals extracted belong to the State of Utah. The mineral values in the lake water are enhanced by solar evaporation. The operations do not entail excavation or conventional mining methods. The "ore" is not solid, but it is rather a concentrated solution bearing magnesium chloride. There are some privately owned land that belong to the owner/operator listed in section 3.1.

Adjacent Landowners

U.S. Bureau of Land Management

Salt Lake Field Office
2370 South 2300 West
Salt Lake City, UT 84119
(801) 977-4300

Craig Bleazard
160 E. North St
Grantsville UT 84029
435-884-6241

Mark Bleazard
342 W Clark St
Grantsville UT 84029
435-884-3200

John Bleazard/Six Mile Ranch
Erda UT 84074
435-830-3747

Rainbow Oil [Amoco Oil]
550 EAST SOUTH TEMPLE
PO BOX 30825,
SALT LAKE CITY, UT, 84130

3.3 Mining Claims and Lease Information

Requirement

> ***"The federal mining claim number(s), lease number(s), or permit number(s) of any mining claims, or federal or state leases or permits included in the lands affected."*** **[R647-4-104.3]**

US Magnesium LLC operates under a mineral lease with the State of Utah #18779. [US Magnesium also uses water rights to bring water into the solar ponds. Table 3-1 summarizes USM water rights information for the facility.

Table 3-1: USM Water Rights

Designation	Volume	Priority	Status	Source	Point(s) of Diversion			Uses
					Township	Range	Section	
15-1616	54750 acft	1965	Cert. 12016	Surface	2N 2N 2N 2N	6W 7W 7W 8W	9 1 10 12	Mineral Extraction Great Salt Lake Water
15-2161	54750 acft	1967	Cert. 12017	Surface	2N 2N 2N 2N	6W 7W 7W 8W	9 1 10 12	Mineral Extraction
16-727	35290 acft	1972	Cert. 12175	Surface	2N	82	12	Mineral Extraction

4.0 [R647-4-105] MAPS, DRAWINGS, AND PHOTOGRAPHS

This section of the Mine and Reclamation Plan addresses the requirements of Section 105 of the large mining operation rule requires topographic and surface facilities maps.

4.1 Topographic Map

Requirement

> ***"A topographic base map must be submitted with the notice of intention. The scale should be approximately 1 inch = 2,000 feet, preferably a USGS 7.5 minute series or equivalent topographic map where available. The following information shall be included on the map:"*** **[R647 –4-1054.1]**
>
> ***"Property boundaries of surface ownership of all lands which are to be affected by the mining operations;"*** **[R647-4-1054.11]**
>
> ***"Perennial streams, springs and other bodies of water, roads, buildings, landing strips, electrical transmission lines, water wells, oil and gas pipelines, existing wells, boreholes, or other existing surface or subsurface facilities within 500 feet of the proposed mining operations;"*** **[R647-4-1054.12]**
>
> ***"Proposed route of access to the mining operations from nearest publicly maintained highway. The map scale will be appropriate to show access."*** **[R647-4-1054.13]**
>
> ***"Known areas which have been previously impacted by mining or exploration activities within the proposed disturbed area."*** **[R647-4-1054.14]**

Figure 4.1 is a topographic/bathymetric map of the Stansbury Basin/Rowley project areas. Because of the large size of the project area the scale for this map is 1 inch = 8,500 feet. All of the features required above are shown on the map.

4.2 Surface Facilities Maps

Requirement

"A surface facilities map shall be provided at a scale of approximately 1" = 200' or other scale as determined necessary by the Division. The following information shall be included on the surface facilities map" **[R647-4-1054.2}**

"Proposed surface facilities, including but not limited to buildings, stationary mining/processing equipment, roads, utilities, power lines, proposed drainage control structures, and, the location of topsoil storage areas, tailings or processed waste facilities, disposal areas for overburden, solid and liquid wastes and wastewater discharge treatment and containment facilities;" **[R647-4-1054.2.121}**

"A border clearly outlining the acreage proposed to be disturbed by mining operations." **[R647-4-104.2.22}**

Figure 4.2 and Figure 4.3 are surface maps of the Stansbury Basin North and South project areas, respectively. They are drawn to a scale of 1"= 2,000' and show all relevant surface facilities. Also shown in theses figures are the facilities to be reclaimed. Reclaimed areas and facilities are further described in section 6.0.

Figure 4.4 is a surface map of the Rowley project Star Pond area. This map is drawn at a scale of 1"= 140' in order to more clearly show other surface features.

5.0 [R647-4-106] OPERATIONS PLAN

Section 106 of the large mining operation rule addresses the operation plan for the facility. As required by that section, references to site maps and drawings is also provided.

5.1 Minerals to be Mined

Requirement

> ***"Type of mineral(s) to be mined;"*** **[R647-4-1065.1]**
>
> ~~*"A description of the nature of the materials to be mined or processed including waste/overburden materials and the estimated annual tonnages of ore and waste materials to be mined;"* [R647-4-105.4]~~

USM's solar extraction process (mining) is directed at magnesium chloride, sodium chloride and other salts of magnesium, sodium, potassium and lithium. Additionally the company utilizes these minerals to produce magnesium metal products, elemental chlorine, and by products such as (but not limited to) calcium chloride and iron chloride.

Annually the solar ponds take in between 25 and 40 billion gallons (or more) of water from the Great Salt Lake. No waste materials are generated from this "mining" operation.

5.2 Nature of Operations

Requirement

> ***"Type of operations to be conducted, including the mining/processing methods to be used on-site, and the identification of any deleterious or acid forming materials present or to be left on the site as a result of mining or mineral processing;"*** **[R647-4-1056.2]**

US Magnesium's solar ponds are sites of natural evaporation and precipitation of chloride and sulfide salts. The raw materials produced for metallic magnesium production are recovered from the solar pond operation in the form of concentrated largely chloride based solutions. These concentrated saline solutions are generally referred to as brines. The intermediate and product brines are transferred via centrifugal pumps. The intermediate brines are transferred via earthen canals. These operations take place in the Stansbury basin facilities that are shown in Figures 4.2 and 4.3. The product brine is transferred via a steel pipeline to the Rowley Project Star Pond that is shown in Figure 4.4. This production of brine constitutes the "mining operation" for US Magnesium. No earth moving of the types usually associated with mining activities are conducted. No generation of overburden or tails occurs as a

result of the operation. Attachment 1 shows photographs taken of Stansbury Basin Facilities.

More specifically the source of raw materials for the manufacture of magnesium metal is the magnesium chloride ($MgCl_2$) that occurs naturally in the Great Salt Lake. The natural magnesium concentration in the South Arm of the Great Salt Lake varies with localized weather patterns. It has been as low 0.18% Mg in 1986 when the lake level was at its zenith, to approximately 1% Mg at the lake's historic low level in 1963. The nominal concentration of magnesium is about 0.45% Mg by weight. To be an economically acceptable feed to the Rowley magnesium manufacturing process, a concentrated feed brine of greater than 8.4% Mg (by weight) is required. The Stansbury Basin ponds occupy approximately 75,000 acres of State Mineral Leased ground. The actual "wet area" within earthen dikes usually amounts to about 60,000 acres. The Stansbury Basin ponds annually bring in between 25 and 40 billion gallons of lake water dependent on the previous year's evaporative performance and inventory needs. The basin is divided into large pond segments. Efficient operation and maximum recovery is achieved by operating the ponds in a continuous mode where the brine advances like a slow moving river that becomes shallower as magnesium concentration increases rather than letting individual ponds evaporate to the desired concentration. The progressive concentration of magnesium is illustrated in Table 5-1, which shows the relative concentrations of the Great Salt Lake and the effluent from three of the ponds in sequence. The magnitude of this evaporation step is illustrated by the fact that less than one percent of the volume of the original Great Salt Lake brine finally reaches the plant for manufacture of magnesium. In concentrating the brine, about five million tons of salts are deposited in the ponds each year.

Table 5-1 Brine Composition (Weight Percent)

	Great Salt Lake Brine	Effluent Pond No. 1S	Effluent Pond No. 2WE	Effluent Pond No. 3C to Holding Pond
Mg	0.45	2.0	4.8	8.5
K	0.3	1.5	3.6	0.15
Na	4.0	7.0	2.6	0.2
Li	0.002	0.01	0.024	0.07
B	0.0018	0.009	0.021	0.06
Cl	7.0	14.0	16.0	22.6
SO_4	1.0	5.0	5.3	4.2

Because of the seasonal variations in weather and temperature in Utah, and because the rate of evaporation is inversely related to the concentration of the brine, it is only possible to achieve the desired final brine concentration in the two or three hottest and driest months of the year typically starting in the month of June. When the target magnesium concentration is achieved, the concentrated brine is pumped to "deep storage" holding ponds. This deep storage is required to avoid the dilution from annual precipitation and to assure an adequate supply of plant feed brine during years when the weather conditions won't permit adequate evaporation/concentration success. Brines that almost reach the desired

concentration are also stored in a way to preserve concentration for use in the subsequent season. In addition to the magnesium rich brine product that serves as the feedstock to the magnesium operation, sodium chloride and potassium salts are also recovered and sold

There are no residues or waste associated with the solar evaporation operation that would lead to acidity or other problems. The evaporative operation naturally precipitates salts that naturally occur in the Great Salt Lake water as solutions become saturated. Over time, natural precipitation (rainfall) and surface run off will re-dissolve the precipitated salts that can be returned to the lake. None of these processes would lead to deleterious deposits, as the ground involved is already hyper saline in chemical composition. There is no tendency to acid production. The natural chemistry of the solar pond system is chemically buffered to a neutral or to a very slightly basic pH.

5.3 Surface Area Estimates

Requirement

> ***"Estimated acreages proposed to be disturbed and/or reclaimed annually or sequentially;"*** **[R647-4-1056.3]**

The solar pond and processing facilities occupy an area of about 75,000 acres. Because of the kinds of operations involved and the boundaries fixed by the mineral lease, the area involved is not anticipated to change over the course of the operations.

5.4 Soils and Soil Management

Requirement

> *"A description of the nature of the materials to be mined or processed including waste/overburden materials and the estimated annual tonnages of ore and waste materials to be mined;"* **[R647-4-106.4]**

> ***"A description of existing soil types, including the location and extent of topsoil or suitable plant growth material. If no suitable soil material exists, an explanation of the conditions shall be given;"*** **[R647-4-1065.5]**

> ***"A description of the plan for protecting and redepositing existing soils;"*** **[R647-4-1065.6]**

The native soils in the solar ponding area are generally granular in nature and tend to be heavy in clay and silt content. Prior to use as a solar evaporative

facility, the area was part of the bed of the Great Salt Lake, and the native materials would best be described as components of the bed of the lake. There is no topsoil present in the area of the solar ponds, nor was there ever any topsoil. There was no appreciable vegetation involved in the area of operation. A plan for protecting and redepositing the topsoil is unnecessary.

5.5 Vegetation and Vegetation Cover

Requirement

> ***"A description of existing vegetative communities and cover levels, sufficient to establish revegetation success standards in accordance with Rule R647-4-111;"*** **[R647-4-1065.7]**

Due to the hyper saline environment and flooded pond areas, there are not any vegetative communities associated with the US Magnesium solar evaporation operations. Revegetation plans are unnecessary.

5.6 Groundwater

Requirement

> ***"Depth to groundwater, extent of overburden material and geologic setting;"*** **[R647-4-1065.8]**

The shallow groundwater in the solar evaporation area is chemically and physically similar to the saline waters of the Great Salt Lake. The presence of the solar evaporative ponds doesn't materially affect the quality or usability of the groundwater. Due to nature of the operation, flooded ponds, depth to ground water is not relevant.

5.7 Mineral, Waste, and Water Management Facilities

Requirement

> ***"Proposed location and size of ore and waste stockpiles, tailings facilities and water storage/treatment ponds."*** **[R647-4-105.9]**
>
> ***"Information regarding the amount of material (including mineral deposit, topsoil, subsoil, overburden, waste rock, or core hole material) extracted, moved or proposed to be moved."*** **[R647-4-105.10]**

The solar evaporative operations do not create or use waste stockpiles, tailings facilities or water storage or treatment ponds. Deposition of natural salts occurs over much of the evaporative pond system.

During the course of a year, the US Magnesium solar evaporation operation "processes" between 25 and 40 billion gallons of Great Salt Lake water. Most of this volume is lost to the atmosphere as evaporated water vapor. Part of the initial volume is lost to precipitation of salts and entrainment of brine in the interstices of those salt layers. The balance is recovered as a raw material from which magnesium metal may be derived.

6.0 [R647-4-110] RECLAMATION PLAN

The requirements for the content of a Reclamation Plan are specified under Section 110 of the UDOGM large mining operations rule. USM has developed its reclamation plan so that it complies fully with the requirements of that section of the rule. Most of the information provided in this section was submitted in previous plans and descriptions that had been submitted by USM.

6.1 Land Use

Requirement

> ***"A statement of the current land use and the proposed postmining land use for the disturbed areas".*** **[R647-4-110.1]**

The land that comprises the USM facilities to be reclaimed is currently used for the transfer, storage, and concentration-by-evaporation of brine from the Great Salt Lake. Subsequent to reclamation, the land use will continue to provide for solar ponding while also flood plain buffer, and ingress/egress to the Great Salt Lake. Future uses will be enhanced by the existence of certain control structures that will be left by USM and should facilitate brine shrimp operations and a number of recreational possibilities.

6.2 Description of Reclamation Activities

Requirement

> ***"A description of the manner and the extent to which roads, highwalls, slopes, impoundments, drainages, pits and ponds, piles, shafts and adits, drill hoses, and similar structures will be reclaimed."*** **[R647-4-110.2]**

Various reclamation activities will be necessary in order to accomplish the future land use objectives described above. Figure 4.1 is an overview of the Stansbury/Rowley Project facilities to be reclaimed. Figure 4.2 – 4.4 are maps that allow a closer view of the facilities so that relative size and configuration can be better depicted.

6.2.1 Dikes and ponds

Reclamation of the dikes and associated ponds will be limited to breaching the dikes at specified locations as indicated in the Figures 4.3 and 4.3 and to re-grading the Small Canal Dike located at the west end of the East West Dike. Breaching will consist either of removing or leaving open existing flow control structures, or excavation of an opening in the dike at those breach locations where no flow control structures currently exist. Flow control structure breaches are

shown in the Figures in yellow, and excavation breaches are shown by a black breach symbol, as indicated in the map legend.

The Holding Pond near the plan site will be reclaimed by knocking down and spreading the berms that form the pond.

6.2.2 Canals

Reclamation of canals will be limited to the Freshwater Canal and the P-11 Canal. These canals will be reclaimed by using a dozer to fill and compact the canal channel with material that was excavated at the time of canal construction. The other canals are shallow (generally less than two feet deep) and need no reclamation.

6.2.3 Brine transfer pipeline

This buried pipeline will be left in place. It will be reclaimed by pouring concrete plugs at both ends of the pipeline. The small HDPE line that supplies fresh water will be removed by pulling. The only other pipe line supplies natural gas to State and public entities and must remain.

6.2.4 Roads

Sections of access roads that do not also serve as dikes will be leveled, unless an agreement is reached with the County or another governmental agency to assume responsibility for such roads. Sections to be leveled are indicated in green in the Figures.

6.2.5 Pump stations, buildings and other ancillary structures

The pumps, shop building, generator building, pads, and other structures located at Pump Station No. 1 will be removed and the area leveled. These structures are illustrated and labeled on an inset to the Figures. The 1600' diameter steel reservoir just south of Pump Station No. 1 will also be removed.

6.2.6 Scope of reclamation activities

In order to accomplish the reclamation objectives described above it will be necessary for USM to undertake a number of steps:

- Removal of chemicals, fuel, oil, etc.: All residual chemicals, solvents, lubricants, diesel fuel, etc. used in current pond operations will be removed prior to equipment/structure removal and demolition activities. These materials will be transported from reclamation areas by truck back to USM process facilities where they will then be reused or disposed in accordance with applicable regulations. Batteries from vehicles and other components will be recycled to the greatest extent possible.

- Removal of equipment and structural components: Equipment and certain appurtenant components such as piping and wiring will be disassembled and staged in order to maximize possible salvage values. The resulting material piles will be moved by truck back to the plant site for subsequent sale or disposal. Materials which cannot be sold for salvage value, or otherwise recycled, will be placed in the USM landfill.
- Demolition: Demolition will consist of knocking down buildings and structures, ripping up the asphalt and concrete pads and hauling way the resulting debris for disposal at the plant site landfill. All building foundations will be demolished to grade.
- Re-grading and re-contouring: Once demolition is complete, disturbed areas will be graded to conform as much as practical to the topography of adjacent surface areas. Any abutments that may have been created during facility construction and/or decommissioning will be leveled to achieve a *minimum slopes of 30% or less.*

6.3 Remaining Surface Facilities

Requirement

> ***"A detailed description of any surface facilities to be left as part of the postmining land use, including but not limited to buildings, utilities, roads, pads, ponds, pits and surface equipment."*** **[R647-4-110.3]**

The following facilities will be left to facilitate post reclamation land use possibilities:

- Existing surface water management control structures located in Pond 1 north and south basins. There are over 50 control structures that are to remain in place. Leaving these structures in place helps direct the natural runoff to most quickly reclaim the salt floors and return those minerals to the Great Salt Lake. Water control structures are shown in yellow in Figures 4.2 and 4.3. Descriptions of the structures are provided in Figure 4.3. Flow control structures include canals, both steel and concrete culverts as well as flow control gates that are to left in an open position during reclamation.
- The dike structure on the north side of the "2 Ponds". The dike will serve as a means of protecting roads, wildlife refuges and other facilities from being washed-out under high lake level/high precipitation conditions. The dike is constructed of earthen material and if of approximate dimensions: 10'deep and 30' to 40' wide.
- The West Canal including associated dikes and culverts. This system is necessary for the routine passage of run-off from Skull Valley that will in turn enhance the dissipation of salt floors in the solar ponds. Destruction of the canal prior to substantial dissipation of salt floors in the solar ponds may cause damage to railroads, roads, and other operations. This canal is also necessary for the future use of the basin for solar ponding. The canal is 3.4 miles long and varies in width from 30' to 40'. It is constructed of earthen materials.

- The three-mile long brine inlet canal located on the West end of the North Dike. This canal provides the only reasonable boat-launching site on the West side of the Great Salt Lake. It has been used by government agencies for various survey purposes. Because of its location, it can serve as a boat access to a lake surface elevation of about 4190 MSL (allowing three feet of depth). The canal is located in the bed of the lake on a mud flat that otherwise allows for no surface vehicle travel. Should the canal become unnecessary in future land use scenarios, USM experience with this facility is that it is subject to rapid sediment deposition and without maintenance would self-reclaim within a short period of time. The width of the canal varies from a nominal dimension of about 80' at the top to 60' at the bottom. It is constructed of excavated native materials.

6.4 Deleterious or Acid-forming Materials

Requirement

> ***"A description of the treatment, location and disposition of any deleterious or acid-forming materials generated and left on-site, including a map showing the location of such materials upon the completion of reclamation."*** **[R647-4-110.4]**

No deleterious or acid-forming materials will be left on-site. The USM pond process involves materials that naturally occur in the Great Salt Lake. Chemicals and lubricants used for maintenance, fuel or in the operation of equipment will be removed prior to demolition and clean-up activities as described above. They will be returned to the USM plant site for further use, recycle, or disposal in accordance with associated disposal regulations.

6.5 Planting Program

Requirement

> ***"A planting program as best calculated to revegetate the disturbed area."*** **[R647-4-110.5]**
>
> ***"Plans shall include, at a minimum, grading and/or stabilization procedures, topsoil replacement, seed bed preparation, seed mixtures(s) and rates(s), and timing of seeding (fall seeding is preferred timing)."*** **[R647-4-110.5.11]**
>
> ***"Where there is no original protective cover, an alternate practical procedure must be proposed to minimize or control erosion or siltation."*** **[R647-4-110.5.12]**

The nature of the Stansbury/Rowley pond areas prior to construction and operation of the facility was that limited vegetation occurred because the salt flat/salt lake ecosystem was unable to support much natural vegetative growth.

Based on these limitations and taking into consideration the proposed future land uses (solar ponds, flood plain expanses, etc.) revegetation is not necessary.

6.6 Statement Regarding Compliance with Reclamation Rules

Requirement

> ***"A statement that the operator will conduct reclamation as required by these rules."*** **[R647-4-110.6]**

USM will conduct reclamation as required by these rules and as described in further detail in this and other sections of the Plan.

7.0 [R647-4-109] IMPACT ASSESSMENT

USM has identified potential surface and/or subsurface impacts due to its brine extraction and treatment process. Potential impacts and proposed mitigation methods are presented below in accordance with Section 109 of the Large Mining Operation rule.

7.1 Surface and Groundwater Systems

Requirement

> ***"Projected impacts to surface and groundwater systems:"*** **[R647-4-109.1]**

Projected impacts to surface and groundwater systems from the USM pond activities are expected to be non-measurable. USM bases these conclusions on observations from several groundwater investigations that have been conducted in the vicinity of but not specific to the Stansbury/Rowley pond facilities as well as the existence of USM engineering and management controls. Groundwater investigations include the following:

- 1971/1972 groundwater studies – Dames and Moore
- 1991 groundwater studies – John C. Halepaska & Associates
- 2001-2007 groundwater studies – Montgomery Watson Harza (*investigations conducted in support of a cooperative investigation with* the USEPA Resource Conservation and Recovery Act litigation)

Regionally, groundwater in the Great Salt Lake area is found within subsurface deposits and occurs in three different aquifers: confined (principal aquifer), deep unconfined, and shallow unconfined aquifers. Of these aquifers, the deep unconfined aquifer is not believed to present. The shallow aquifer dominates the groundwater regime in the pond area. The shallow aquifer extends from the bedrock mountain front of the Lakeside Mountains easterly to the Great Salt Lake and can be either confined or unconfined depending on the presence of low hydraulic conductivity layers within the aquifer. The shallow aquifer is generally defined as the uppermost permeable unit within the unconsolidated lake sediments and typically overlies a low permeability sediment layer. The thickness of the shallow aquifer various but is generally between 50 and 200 feet thick.

Based on the investigations referenced above it is believed that the groundwater in the vicinity of pond operations can be characterized as follows:

- The deeper portion of the shallow aquifer appears to be confined by a silty clay layer with a hydraulic conductivity of approximately 0.7 ft/day.
- There also appears to be an upward gradient from the deeper portion of the aquifer into the overlying shallow portion of the aquifer that results in groundwater from the deeper portion of the aquifer leaking into the shallow portion.
- Groundwater flow is generally to the east-northeast.

Although the higher concentrations of salts in certain ponds within the Stansbury-Rowley pond area could conceivably introduce a density gradient that would result in higher salt concentration water being leaked into the aquifer (the specific gravity in USM ponds reaches 1.3 whereas the specific gravity of water from Great Salt Lake is closer to 1.1), the existence of the upward groundwater gradient would minimize this affect.

All groundwater quality in this area is characterized as Class IV, i.e. saline water containing greater than 10,000 mg/l of total dissolved solids. Based on the above analysis USM pond operations are not anticipated to cause significant change to groundwater quality or limit its use to any less standard than is currently designated for Class IV groundwater.

Despite the lack of projected impacts to the groundwater system, there is a small potential for impact to surface waters such as ditches and ponds. This could result from ancillary pond operations where diesel fuel, oil, used oil, etc. are loaded, unloaded, stored, or otherwise handled. Since leaks from such sources can potentially impact surface water, USM a devised a series of engineering and management controls to prevent such occurrences:

- The construction of impervious, secondary containment around all bulk oil handling and storage facilities of adequate size to contain leaks and spills.
- The location of hook-ups for loading and unloading within that containment.
- Routine inspections of oil and fuel handling facilities.
- Use of cleaning solvents, greases, and lubricants are restricted to enclosed buildings or areas underlain by concrete/asphalt pads.
- Regular awareness and/or training sessions for all employees involved in oil handling facilities.
- A management requirement for routine inspections and the immediate cleanup of oil spills should such spills occur outside of containment facilities.

These controls are specified in the USM Spill Containment and Countermeasure Plan. (Attachment 2). This plan is updated as required and signed by a Professional Engineer.

7.2 Threatened and Endangered Species

Requirement

> ***"Potential impacts to state and federal threatened and endangered species or their critical habitats;"*** **[R647-4-1093.2]**

Utah "sensitive species" present in Tooele County are shown in Table 7-1. (The state threatened and endangered species program ended in 1998.) This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation

System. The list includes both current and historic records and was last updated on July 1, 2008.

Only 3 of the species found to be present in Tooele County have been observed at USM facilities:

- American White Pelican
- Long-Billed Curlew
- Short-Eared Owl

TABLE 7-1: SENSITIVE SPECIES FOUND IN TOOELE COUNTY, UTAH

Common Name	Scientific Name	Observed at USM
American White Pelican	*Pelecanus Erythrorhynchos*	Yes
Bald Eagle	Haliaeetus Leucocephalus	No
Boblink	Dolichonyx Oryzivorus	No
Bonneville Cutthroat Trout	Oncorhynchus Clarkii Utah	No
Bonytail	Gila Elegans	No
Burrowing Owl	Athene Cunicularia	No
California Floater	Anodonta Californienses	No
Columbia Spotted Frog	Gana Luteiventris	No
Dark Kangaroo Mouse	Microdipodops Megacephalus	No
Eureka Mountainsnail	Oreohelix Eurekensis	No
Ferruginous Hawk	Buteo Regalis	No
Grasshopper Sparrow	Ammodramus Savannarum	No
Greater Sage-Grouse	Centrocercus Urophasianus	No
Kit Fox	Vulpes Macrotis	No
Least Chub	Iotichthys Phlegethontis	No
Lewis's Woodpecker	Melanerpes Lewis	No
Long-Billed Curlew	Numenius Americanus	Yes
Lyrate Mountainsnail	Oreophelix Haydeni	No
Northern Goshawk	Accipter Gentilis	No
Northwest Bonneville Pyrg	Pyrulopsis Variegata	No
Preble's Shrew	Sorex Preblei	No
Pygmy Rabbit	Brachylagus Idahoensis	No
Short-Eared Owl	Asio Flammeus	Yes
Southern Bonneville Springsnail	Pyrgulopsis Transversa	No
Southern Tightcoil	Ogaridiscus Subrupicola	No
Townsend's Big-Eared Bat	Corynorhinus Townsendii	No
Utah Physa	Physella Utahensis	No
Yellow-Billed Cuckoo	Coccyzus Americanus	No

Based on plant observations, it is the American White Pelican that seems to be more significantly impacted by pond facilities. Pelicans infrequently swim in the ponds whereas the other two sensitive bird species do not use the ponds in that manner and, consequently, do not expose feathered areas of their bodies to brine solution. Annually fledging pelican chicks occasionally fatigue and land on the

solar ponds for rest. On occasion these birds become dehydrated or exhausted and need to be rescued. . USM has a well-developed program for rescuing birds under these situations. It is described in the mitigation section.

The only Federal Threatened and Endangered Species that has been observed in the general area of the Stansbury/Rowley Project facilities is the Peregrine Falcon. Sightings of this hawk have been very infrequent. Falcons and hawks do not swim in ponds and, consequently, are not adversely affected by pond operations.

7.3 Soils

Requirement

> ***"Projected impacts of the mining operation on existing soil resources:"*** **[R647-4-1097.3]**

There will be very minimal effects on soil resources as a result of the Stansbury/Rowley ponds operations.

There are four major types of soils known to be present in this area of the Gr eat Salt Lake Basin:

- Calcareous clays, silts, and fine sands (These are the predominant soil type in USM pond areas.)
- Oolitic sands found mainly in areas of shallow water, along shorelines, and in adjoining areas where re-deposition has occurred due to wind activities.
- Algal reef deposits encountered mostly encountered in the silty cemented sands.
- Saline deposits – both soluble and insoluble – encountered in thin layers and fragments with calcareous fine sands.

The soil types that exist in the pond area have continually been exposed over geologic time to Great Salt Lake brine through various lake level increases during periods of high precipitation and accompanying rising lake levels and flooding. Because of this fact contact with ponds solutions will not significantly change any *the soil characteristics other than promoting the formation of saline deposits in* greater proportions than might otherwise be found.

Other Potential impacts to soils that aren't as consistent with natural background soil characteristics can occur due to ancillary operations. These operations, as noted above, involve the use of various chemicals, fuels, and lubricants. Releases of these materials to soils are prevented by a number of engineering and management controls. Cleaning solvents, greases, and lubricants are used in enclosed buildings or on concrete/asphalt pads so that there is minimal contact with unprotected soil. Diesel fuel and used oil and other oil products used in bulk quantities are unloaded and stored in tanks within bermed areas that are lined with impermeable membranes. Spills of oil materials outside of containment are handled in accordance with spill plan provided in Attachment 1. That plan

requires that any soils contaminated by oil spills be excavated and disposed in accordance with applicable regulations.

Some impacts do occur from salt accumulations on pond bottom sub-surfaces. During operation of USM pond facilities a super-saturated brine is formed that causes various calcium, magnesium and sodium compounds to precipitate out of solution. The sediment formed from these salts accumulates in the pond bottom over time in amounts in excess of what is found naturally in the Great Salt Lake. The reclamation plan proposed by USM will mitigate these effects as described below.

7.4 Other Impacts

Requirement

> ***"Projected impacts of mining operations on slope stability, erosion control, air quality, and public health and safety;"*** **[R647-4-1097.4]**

There are no significant impacts on slope stability and erosion because USM pond operations involve highly stable, low profile earthen structures and paved or lined areas. Although wind and wave action does tend to erode certain facilities, such as the east-west dike, USM maintains those facilities in good condition so that there is no significant disruption to the pond operations. After closure such facilities will be breached any remaining dike construction will naturally degrade over a short time frame so that conditions approaching pre-mining will be attained.

Because of the nature of the USM pond processes, air emissions are minimal and readily controlled so that there is insignificant impact to air quality. Some impact does occur due to fugitive dust from roads and combustion emissions from diesel fuel engines used for operate brine transfer pumps. USM controls these emission sources in a variety of ways:

- Fugitive dust: USM has developed a fugitive dust plan for control of fugitive dust from roads. (Attachment 3). The plan requires routine inspections and the use of $MgCl_2$ and/or water spray applications for dust control depending on the nature and significance of the source.
- Diesel emissions: Under UDAQ Title V operating permit #4500030001, USM is required to maintain diesel engine emissions at 20% opacity or less. Visible emission observations (VEO's) are made by a certified VEO observer at frequencies specified in the permit to insure compliance with that requirement. Should emission opacities in excess of the 20% limit be observed, the pond operating crew (Grounds Department) is notified and appropriate corrective action is taken.

There are no impacts to public health and safety. Pond facilities are extremely remote. All roads into and out of pond areas are fenced and gated, with gates maintained in a locked condition even during business hours.

7.5 Mitigation

Requirement

> ***"Actions which are proposed to mitigate any of the above-referenced impacts."*** **[R647-4-1097.5]**

Threatened and Endangered Species

Although there are no Threatened and Endangered species, the American White Pelican – which is a "sensitive" specie in Utah – can be impacted by pond operations. Pelicans that become incapacitated in the ponds are rescued, cleaned off, and released per the following procedures.

- Operators in the pond areas or other USM employees who also frequent those areas are required to inform the USM Environmental Coordinator when there is a bird in distress in the ponds.
- The USM Environmental Coordinator then retrieves the bird using a boat or other means and moves it by truck to a secluded area.
- Salt is then washed from the bird's wings and other areas while the bird is held by a second party.
- The bird is then released to the environment.

In order to undertake these rescue and release measures, USM is required to have trained personnel and to have obtained proper permits and licenses.

- State Certificate of Registration issued by the Utah Division of Wildlife Resources, and
- U.S. Fish and Wildlife permit

Salt Deposition

Mitigation of salt deposits that occur on Stansbury/Rowley brine ponds will be accomplished naturally by allowing fresh water to flow into the ponds and re-dissolve the accumulated salts. A similar phenomena was observed in 1986 by the company who operated the facility at that time. The flooding earlier in that year caused approximately 25% of the accumulated to dissolve in a relatively short time resulting in a loss of potential feed stock along with the damages to the dike system (see Attachment 4). By limiting the flow of salt water and concentrated brine into these ponds while at the same time promoting the flow of fresh into the ponds the same results will be obtained albeit over a longer time frame. Section 6.0, Reclamation Plan, describes the methods intended by USM to promote fresh water flow to the ponds.

8.0 {R647-4-113} SURETY AND BONDING

8.1 Reclamation Cost Estimate

Reclamation costs for the conducting the reclamation plan activities described in section 6 were estimated in 2002 as part of USM's initial reclamation contract. The costs are summarized in Table 8-1.

At the May 29th meeting with UDOGM, USM agreed to a proposed increase in those costs that was calculated by UDOGM in order to account for inflation between 2002 and 2008. The revised cost for reclamation based on UDOGM's increase is $421,588.00.

8.2 Surety Type

In order to increase the reclamation surety to the amount required by UDOGM, USM arranged for an amendment to the irrevocable standby letter of credit issued in 2002. The amendment is now attached to that original letter of credit (# SM200055W) and becomes an integral part of that letter of credit. Attachment 5 is a copy of the June 23, 2008 amendment that was forwarded to UDOGM in order to formalize the surety arrangement.

8.3 Reclamation Contract

The Reclamation Contract was also amended to coincide with the new surety requirement. It was transmitted by USM and received by UDOGM on June 24, 2008. A copy of the current Reclamation Contract is enclosed in Attachment 6.

8.4 Surety Release

Following the completion of the required reclamation activities, and appropriate documentation, USM will apply for surety release.

8.5 *Surety Adjustments and Revisions*

In accordance with Utah Rule R647-4 for large mine operations, the mine & reclamation plan and surety agreement will be reviewed every 5 years. As elements of the reclamation plan are completed, corresponding reductions in the amount of surety provided will be proposed to UDOGM by USM.

TABLE 8-1: STANSBURY/ROWLEY PROJECT RECLAMATION & BOND COSTS - 2002

Operation	Quantity	Unit Cost	Extended Cost
A. CLEAN-UP			
1. Removal of Structures & Equipment			
a. Shop	3200 ft^2	$3/$ft^2$	$9,600.00
b. Generator building	1	$1,500.00	$1,500.00
c. P-10 pump building	1	$3,000.00	$3,000.00
d. steel structures at pump stations	11	$10,000.00	$110,000.00
e. metal flumes	2	$2,400.00	$4,800.00
f. concrete gates	8	$1,250.00	$10,000.00
g. bridges	2	$1,000.00	$2,000.00
h. tanks	4	$1,325.00	$5,300.00
i. wooden control gates	2	$1,250.00	$2,500.00
Subtotal			$148,700.00
2. Trash removal			
a. East road	1	$1,600.00	$1,600.00
3. Leveling of ancillary facilities, pads & access roads			
a. roads	11.3 acres	$2,000/acre	$22,600.00
b. concrete pads – so. pump station	86 yds^3	$100/ yds^3	$9,600.00
c. asphalt pad – south pump station	12000 ft^2	$1/$ft^2$	$12,000.00
Subtotal			$45,800.00
B. REGRADING/ RECOUNTOURING			
1. Earthwork including hauling & grading of spoils, waste, & overburden			
a. freshwater canal D8	200000 yd^3	$0.10/ yd^3	$20,000.00
b. p-11 canal – D8	84000 yd^3	$0.10/ yd^3	$8,400.00
c. small canal dike – w. of EW dike	10000 yd^3	$0.55/ yd^3	$5,500.00
d. holding ponds	200000 yd^3	$0.10/ yd^3	$20,000.00
2. Structure removal/breeching of dikes			
a. remove culvert – north dike	1	$3,000.00	$3,000.00
b. breech pond 2W	2	$500.00	$1,000.00
c. breech pond 3 center, south dike	2	$500.00	$1,000.00
d. breech main road	2	$500.00	$1,500.00
e. breech EW dike	1	$1,000.00	$1,000.00
f. remove intermediate pond gate	1	$4,000.00	$4,000.00
Subtotal			$41,400.00
C. LABOR			
1. Supervision	60 days	$386/day	$23,160.00
2. Labor exclusive of bulldozer use			
a. refueler/lube – truck & supplies	60 days	$800/day	$48,000.00
b. transportation of equipment	10 days	$600/day	$6,000.00
c. mobilization	1		$6,000.00
Subtotal			*$82,160.00*
D. OTHER			
1. Bond life for 5 years			$318,060.00
2. Contingency @ 10%			$31,806.00
TOTAL			**$349,866.00**

Attachment 1: Stansbury Basin Photographs

Attachment 2: *Spill Prevention, Containment and Countermeasures Plan*, US Magnesium LLC, July, 2005

Attachment 3: *Fugitive Dust Control Plan*, US Magnesium LC, August, 2005

Attachment 4: *Stansbury Basin Solar Ponding Reair Estimate*, Dames & Moore, October 9, 1986

Attachment 5: Amendment *to Irrevocable Standby Letter of Credit*, Wachovia Bank, National Association, June 23, 2008.

Attachment 6: Large Mine Reclamation Contract, State of Utah Department of Natural Resources, Division of Oil, Gas and Mining and US Magnesium LLC, June 24, 2008.

Proposed Response to UDOGM April 17,2009 Comments on USM Mine & Reclamation Plan

UDOGM Comment # (Plan reference)	Plan Reference	UDOGM Comments	Proposed USM Response
1	General	Submittal should be formatted to easily incorporate additional revisions and amendments.	Submittal is already formatted to easily incorporate addition revisions and amendments.
2	All	The Division suggest sthat the plan be organized and labeled according to the R647 rules, I.e. instead of section 3.0 label section as R647-4-104.	Plan organization is based on a logical grouping of subject matter that is required under R647 rules including when subject matter is meant to address more than one part of the regulation. Changing format will also result in unproductive time spent in changing the table, figure, etc. numbering system. Instead of reformatting, USM will add cross-references in the appropriate sections and the table of contents to more efficiently accommodate this issue.
3		-- [NO COMMENT 3 PROVIDED BY UDOGM.]--	
4	Page 7	Include the resposible party in Operator info, the Corporate Officer(s) that will sign all documents.	Provided
5	Omission	Include the the name, permanent mailing address and phone number of all surface mineral landowners to be affected.	Provided
6	All	Rowley is a large operation, multiple maps are needed to detailinformation at a scale that is practical for the intent of the requirements.	Not all the Rowley facility is covered under R647 rules. This was discussed and agreed to in the May 2008 meeting between UDOGM and USM which was consistent with negotiations that USM has had with UDOGM over the past several decades.
7	Fig 4.1	Green highlighter line on the map is not labeled on the legend.	This will be added as the plan is finalized and other revisions agreed to
8	Omission	Property boundaries of surface ownership of all land affective [sic] map is missing	Because this "mine" consists of solar evaporation ponds located on the bed of the Great Salt Lake, the land is owned by the State of Utah. [Note that the land is actually submerged for the most part.]
9	Omission	Utilities are not shown on the Figure 1.4 as listed in text on page 9.	There are no applicable [R647-4-105.1.12] utilities that cross the solar pond area. The natural gas pipeline and power lines are on appropriate rights of way (see figure 4.3)
10	Omission	Not all facilities for the site have been included. The USGS map does not match figure 4.2, 4.3, and 4.4. As per 105.3.12 - "a border clearly outlining the acreage."	To be resolved while taking into account issues regarding USM response to UDOGM comment #6.
11	Omission	"Show any regraded slopes steeper than 2H:1H" as per 105.3.11.	This requirement seems to be related to earthen mining activities, and doesn't seem to have meaning related to the solar pond activities.

12	Omission	"Cross section of roads or other earthen structures" as per 105.3.12. This would include cross sections of the dikes.	This information will be provided
13	Omission	"water impounding structures ... greater than 20 acres" as per 105.1.13	Water impounding strucures covered under R647 rules are already shown and comprise the"mine." Requirement R647-4-105.1.13 seems to note access from public roads. [New numbering R647-4-105 3.13]
14	Omission	"area which will be disturbed but not reclaimed" as per 105.3.14	US Magnesium would like to have a further discussion to clarify what is disturbed and what "not reclaimed" means in the context of 75,000 acres of salt covered solar ponds.
15	Omission	"actual solar ponds are shown, and defined on figure 4.2 and 4.3, but other hydrology strucures are not defined for the rest of the operation.	See response to UDOGM comment #6. The other hydrologic features are not on the "mine site" and are cover by other rights of way governed by other agencies.
16	Omission	No baseline studies have been included as per 105.3.16.	USM is pre-existing facility and baseline studies are not relevant. Soils, vegetation,watersheds, etc. are not applicable in this case. Refer to UDOGM agreement from May, 2008 meeting.
17	Omission	As per 105.3.17 not enough information has been submitted to demonstrate that existing plan will result in a post mining use that is compatible with the state lease.	UDOGM comment needs to be more specific in order to provide a proper response. The area currently operated by the solar ponds will always have value for mineral extration. The State's Great Salt Lake Comprehensive Management plan designates the area for mineral extraction.
18	Omission	As per 105.3.17 drawings to be utilized for adequate bonding and reclamation practice. Must include estimated acreages.	Estimated acreages will be included on drawings that are being prepared. The area of mineral lease is 75,000 acres. The area within the current dikes is about 65,000 acres
19	General	Depending upon the quality of information submitted, additional comments could be forth coming.	USM responses to comments are stongly dependent on UDOGM coming to a common internal understanding as to what USM facilities are applicable and preparing their associated comments for those facilities in a clear and detailed manner. This UDOGM comment indicates that UDOGM comments are not clearly presented or explained with enough detail to solicit an adequate response.
20	General	More photographs are recommended by OGM, but not required.	No additional photographs will be provided.
21	Page 13	Include an estimate on the details of reclamation that can be included, give an explanation on those details that cannot be included. At a minimum include the duration of reclamation.	The duration for reclamation will be provided.
22	Omission	No impacts have been noted in your processing areas.	See USM response to UDOGM comment #6.

23	Page 22	Attachment 2 has not been signed by and stamped by a PE. This is a requirement of the Clean Water Act and not the Division.	The copy previously provied came from an electronic copy. A signed approved copy is provided.
24	Omission	No impacts have been noted in the processing areas.	See USM response to UDOGM comment #6.
25	Omission	No Air Quality impacts have been noted in text relating to USM process facilities, inclding the smokestack.	See USM response to UDOGM comment #6.
26	Omission	No actions listed, for the above possible impacts	See USM response to UDOGM comment #6.
27	Page 16	An acceptable post mine use is has [sic] NOT been provided, all other leases from FSSL incude the post mining use to be returned to the natural environment, as is reasonably practical.	The proposed post mine land use is both practical and consistent with previous agreements between USM and UDOGM. It is also based on providing a higher value land use than "the natural environment" which in the best interests of UDOGM, USM and the people of Utah. The area of the lake bed is designated for mineral extraction in the Great Salt Lake comprehensive management plan
28	Page 16, Figure 4.2-4.3	More reclamation is needed than is shown of the figures. Due to the unique geographic location on the Great Salt Lake, wave action alone will not reclaim the dikes and pond.	USM has more than 35 years experience in designing, operating, maintaining and reclaiming pond and mining facilities on the Great Salt Lake. USM's proposed reclamation approach is based on that experience. UDOGM's comment has not been satisfactorily research or backed by sound understanding of the effects of wave action in the Great Salt Lake.
29	Figure 4.4	No detail is included on the reclamation of the Star pond. Elsewhere the star pond is named "the holding pond." Please use consistent terminology.	The label on Figure 4.4. will be changed. Holding Pond is the more correct term.
30	Page 17, 6.2.2	How will the other canals be reclaimed?	The other canals are shallow (generally less than two feet deep) and need no reclamation.
31	Page 17, 6.2.3	How will the other pipelines be reclaimed?	The small HDPE line that supplies fresh water will be removed by pulling. The only other pipe line supplies natural gas to State and public entities and must remain.
32	Page 17, 6.2.4	As shown on maps it is difficult to locate roads indicated by the "green lines".	A more specific comment is necessary in order for USM to properly respond.
33	Page 17, 6.2.6	In Section 6.2.6, the plan says, "Equipment and certain appurtenant components ... will be disassembled and staged in order to maximize possible salvage values." Please include more definition on what equipment and structural components are dissasembled and which components are not.	Disassembly, salvage, etc. activities are highly dependent on the condition of the equipment at the time when decommissioning and reclamation occurs. Obviously at this time only examples can be provided. But given the simplistic nature of the operation it should be fairly obvious as to the nature of equipment that is used in the storage and transfer of Great Salt Lake brine.

34	Page 18, 6.3	As written many of the earthen structures are to remain in place for various reasons, if you have written documentation from other agencies that certain earthen structures have a post minimg use, then the earthen structures can remain after reclamation. All other structures will need to be reclaimed and included in the surety bond calculation. Until reclamation commences the structures will be included in surety calculations.	Proposed reclamation methods. bond calculations, etc.are consistent with previous negotiations and agreements made with the UDOGM over the last several decades. More specifically, surety calculations have already been approved by UDOGM in accordance with the May 2008 meeting and the resulting financial assurity instrument provided by USM has been accepted. Consequently, this comment is irrelevant.
35	Omission	The division of Forestry, Fire and State Lands has requested periodic breaches of the dikes 300 feet wid, at a minimum spacing of 1600 feet and a maximum spacing of 1 mile at the cessation of mineral extraction. Include the removal of structural dike components including culverts and gate structures, etc.	See USM response to UDOGM comment #34.
36	Omission	No description is included about what processing facilities will be left after minimg. Is it assumed that all processing facilities will be removed?	All processing facilities associated with the pond operations will be removed. Consequently, no description is necessary.
37		-- [NO COMMENT 37 PROVIDED BY UDOGM.]--	
38	Omission	The application does not contain a variance section, and the Division assumes no variances are being requested. Please state whether any variances are being requested. If they are, the plan will need to have proper documentation to support the request.	No variances are being requested. The mining language in sections 107, 108, and 111 don't match what US Magnesium does. US Magnesium would like to discuss what you think might b e appropriate needs for variance may constitute.
39	General	The Division requests that you use bonding worksheets and formats provided by the Division. When finalized, these forms will be incorporated into the mine plan.	See USM response to UDOGM comment #34.
40	General	Break out surety worksheet as it applies to the BLM.	See USM response to UDOGM comment #34.
41	General	The surety is lacking in detail, as the additional requirements are received from the Operator, there will be additional comments.	See USM responsesto UDOGM comments #19 and #34.

N

HILL BROTHERS
CHEMICAL

READ ALL NOTES FIRST
DO NOT SCALE PRINTS

NO	REVISION	BY	DATE	CHK	DATE
A	FOR REVIEW, CHECKING AND APPROVAL				

- APPROVALS -

	BY	DATE
ENGINEERING		
MAINTENANCE		
PRODUCTION		

DEPARTMENT	SIGNATURES	DATE
ENG. (DRAWN BY)	ALL DRAFTSMEN	
ENG. (CHECKED BY)		
ENG. (APPLIED ENG.)		
ENGINEERING		
MAINTENANCE		
PRODUCTION		
SAFETY		

TOLERANCES
FRACTIONS
.XX
.XXX
ANGLE
UNLESS OTHERWISE NOTED

PROJECT NUMBER
CAD FILE NUMBER

ROWLEY PROJECT
HOLDING PONDS

USmag US Magnesium LLC
Salt Lake City, Utah

DRAWING NUMBER
FIGURE 4.4

REV. 0

SCALE NONE UNLESS OTHERWISE NOTED

ORIG. NO.

REFERENCE DRAWING TITLE

Spill Prevention Control and Countermeasure Plan

For

US MAGNESIUM LLC

ROWLEY, UTAH

Revised: July 2005

SPCC PLAN – US MAGNESIUM LLC
ROWLEY, UTAH

TABLE OF CONTENTS

1. CERTIFICATION

I hereby certify that I have examined the facility, and being familiar with the provisions of 40 CFR 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

Engineer: DALE CARL ASHTON

Signature: Dale Carl Ashton

Registration Number: 152137

State: UTAH

Date: JULY 29, 2005

2. SPCC PLAN REVIEW

In accordance with 40 CFR §112.5(b), a review and evaluation of this SPCC Plan is conducted at least once every three years. As a result of this review and evaluation, US Magnesium LLC (USM) will amend the SPCC Plan within six months of the review to include more effective prevention and control technology if: (1) such technology will significantly reduce the likelihood of a spill event from the facility, and (2) if such technology has been field-proven at the time of review. Any amendment to the SPCC Plan shall be certified by a Professional Engineer within six months after a change in the facility design, construction, operation, or maintenance occurs which materially affects the facility's potential for the discharge of oil into or upon the navigable waters of the United States or adjoining shorelines.

Review Dates	Signature
5/21/2002	
7/29/2005	

3. MANAGEMENT APPROVAL

US Magnesium LLC is committed to the prevention of discharges of oil to navigable waters and the environment, and maintains the highest standards for spill prevention control through regular review, updating and implementation of this Spill Prevention Control and Countermeasures Plan for the Rowley Plant.

4. DESIGNATED PERSON

The following person attests that he or she is knowledgeable of the procedures, methods, and equipment to prevent the discharge of oil and other regulated substances into or upon the navigable waters of the United States, or adjoining shorelines, and that he or she is accountable for oil spill prevention from the tanks at the Rowley plant and the Stansbury pond facility.

_____

Name

_____

Title

5. APPLICATION OF SPCC REGULATION

5.1 Location

The US Magnesium LLC (USM) Rowley Plant is a primary magnesium manufacturing facility located fifteen (15) miles North of exit 77 from Interstate 80. The Rowley Plant is approximately two miles from the Great Salt Lake. In addition to the manufacturing plant, operations include the Stansbury pond facilities that are located 12 miles southeast of the plant.

5.2 Description of Operations

The Rowley Plant produces magnesium metal that is primarily used as alloying agents for aluminum and in die casting products such as automotive and sporting goods components. In addition to the storage of oil products (diesel and gasoline) for the maintenance and operation of vehicles and process equipment there is also storage of oil based process chemicals – decanol and kerosene.

The raw material for the production of magnesium is the mineral rich water from the Great Salt Lake. The brine from the Great Salt Lake is further concentrated by evaporation in a system of solar ponds. In order to transport the brine through the solar pond complex a system of pumps and canals is used. To provide fuel to the pumps and the vehicles associated with maintaining the ponds, fuel tanks and oil products are located at the Stansbury pond facilities.

5.3 Affected USM Facilities

Based upon the geographical location and characteristics (such as proximity to navigable waters or adjoining shorelines, land contours, drainage, etc.) of the Rowley plant site and Stansbury pond facilities, there is generally no reasonable expectation of a discharge of oil into or upon the navigable water of the United States or adjoining shorelines.

The only facilities that could have any possibility of discharging oil into or upon navigable waters of the United States or adjoining shorelines are the P-0 and P-10 pump stations which are located near to the Great Salt Lake. These stations, which are part of the Stansbury pond facilities, include diesel fuel storage tanks and used oil storage tanks.

Even though there is no requirement to include other facilities beyond those at P-0 and P-10, USM intends to apply the same good SPCC engineering practices at other oil storage facilities and locations to prevent and/or contain discharges at those facilities.

5.4 Spill History

USM and its predecessor companies at the Rowley plant have never had any spills of gasoline, diesel, or oil that reached or threatened navigable waters in the entire history of the Rowley plant and associated solar pond operation. In addition, no spills of diesel, gasoline, or oil have occurred that required reporting to regulatory agencies.

5.5 Spill Consequences

With the exception of P-0 and P-10 it is expected that any spills of gasoline, diesel, or oil would not reach any navigable waters and would remain on USM and/or USM-leased lands. Furthermore, if the tanks or containers at P-0 and P-10 failed catastrophically, the secondary containment provisions at those facilities would contain the entire volume of the spill and no release to the environment would occur.

6. OIL FACILITY REQUIREMENTS

6.1 Tank and Piping Construction

No tank or associated piping should be used for storage or transport of regulated substances unless its materials of construction are compatible with the material being stored. Conditions of storage and transfer such as pressure and temperature should be considered.

Tanks and associated piping at all pump stations are constructed of mild steel. Tanks are typically painted tan and rest on timbers within the lined secondary containment structure.

New and old installations should, as far as practical, be engineered in a fail-safe manner or updated into a fail-safe condition to avoid spills. The use of a site glass tube or equivalent should be used to determine liquid level as much as possible.

6.2 Secondary Containment

All bulk tanks storing regulated substances should be provided with a secondary means of containment for the entire contents of the largest single tank plus sufficient freeboard (an additional 10%) to allow for precipitation. Diked areas, berms, or retaining walls should be sufficiently impervious to spills. For tanks, secondary containment is typically constructed of earthen berms lined with polyethylene. See Table 1 for a listing of tank and secondary containment volumes.

In addition, USM's waste pond does not discharge to navigable waters. As a result in the unlikely event that any oil is spilled from an in-plant location in quantities large enough to reach the waste pond, the spill would float on the water and be recovered by USM personnel without reaching navigable waters.

6.3 Buried Piping

Buried metallic piping installations should be provided with the appropriate protective wrappings and coatings. Any section of a buried line that is exposed for any reason should be carefully examined for deterioration. The necessary corrective action should be taken as indicated by the by the degree of deterioration found.

Pipelines not in service or in standby service for an extended period of time, should be capped or blank-flanged at the terminal connection and marked as to origin.

6.4 Above Ground Piping

All above ground valves and pipelines should be designed and installed in order to facilitate routine inspections of condition. Equipment should be inspected at least once a year. This inspection should assess the general condition of flange joints, expansion joints, valve glands and bodies, pipelines supports, and all other metal surfaces. Inspection records should be maintained for a period of three years.

Pipelines should be properly designed to minimize abrasion and corrosion and allow for expansion and contraction.

6.5 Security

Due to the remote location of some of these facilities, lighting is not feasible. During operation, lights are available at P-0 to facilitate inspection of the engines during nighttime hours. A gate installed across the road leading to P-0 controls access to P-0.

7. PROCEDURAL REQUIREMENTS

7.1 Tank Truck Loading and Unloading

During unloading of trucks, all applicable DOT rules and regulations will be followed. Also, all truck connections to the tank being filled will be accomplished in such a way as to contain any material transfer spills. To prevent any spills, tank trucks will not be moved until a USM employee has independently verified that all connections from the tank truck to tank being filled have been adequately secured. A USM employee and the tank truck driver will also verify that all valves on the truck have been closed and are not leaking.

7.2 Drainage of Rainwater from Secondary Containment

Because the USM facility is located in the west desert of Utah, it is generally expected that precipitation that collects in secondary containment will evaporate quickly without the need arising to drain or pump water out of the secondary containment units.

If the need arises to remove rainwater from secondary containment by physical means the environmental manager or his/her designee shall be responsible for rainwater removal.

Drainage or pumping of rainwater from the secondary containment area is acceptable only if:

1. Inspection or analysis of rainwater is performed prior to discharge to prevent the release of visible sheen of oil.

2. Adequate records of pumping or draining are kept through completion of the Rainwater Discharge Checklist attached as Table 2.

7.3 Inspections and Follow-up

Inspection should be in accordance with written procedures developed for the facility. These written procedures and record of the inspection, signed by the appropriate supervisor or inspector should be made part of the SPCC Plan and maintained for a period of three years.

Visible oil leaks that result in a loss of oil from tank seams, gaskets, rivets and bolts sufficiently large to cause the accumulation of oil in diked areas should be promptly corrected.

Damaged or deteriorated equipment or piping should be reported to the appropriate supervisor and repairs completed in a timely manner.

7.4 Integrity Inspections/Testing

Above ground storage tanks should be visually inspected annually. These records should be maintained for three years. Each tank, associated piping, and support facility should be visually inspected for deterioration and required maintenance using the Tank and piping Inspection Log Form that is attached as Table 3. A form should be completed, signed, and dated by the inspector for each visual inspection.

All tanks should be tested for integrity using ultrasound equipment as necessary based on visual inspections. Results will be forwarded to the SPCC designated person.

7.5 Contingency Plan

Any spills or releases from secondary containment for tanks containing diesel, gasoline, or oil should be responded to as specified in the USM Emergency Response Plan.

8. PERSONNEL TRAINING

Each new employee should be briefed on the SPCC requirements pertaining to his/her job. The SPCC Plan should be reviewed periodically with personnel. Supervisors are responsible for properly instructing their personnel in the operation and maintenance of equipment to prevent the discharges of petroleum products.

Supervisors should schedule and conduct spill prevention briefings for their operating personnel annually to ensure adequate understanding of the SPCC Plan for that facility. These briefings should highlight and describe known events or failures, malfunctioning components, and any recently developed precautionary measures.

TABLE 1

SPCC STORAGE TANK INVENTORY

TANK DESCRIPTION	TANK CONTENTS	STORAGE VOLUME (ft3)	CONTAINMENT VOLUME (ft3)
Bulk Storage	Fuel Oil	47689	51543
Electrolytics	Fuel Oil	1055	1186
Transformer	Transformer Oil	1859	14000
Auto Shop	Fuel Oil	1331	1554
Auto Shop	Fuel Oil	1331	1554
Boron Plant	Decanol	2261	2614
Boron Plant	Kerosene	2261	2614
Boron Plant	Kerosene and Decanol	1583	3840
P-0	Diesel Fuel	1608	3840
P-0	Waste Oil	86	104
P-9	Diesel Fuel	679	802
P-10	Diesel Fuel	603	690
P-10	Waste Oil	85	130
P-11	Diesel Fuel	1055	2128
P-11	Diesel Fuel	537	2128
S. Pump Station	Diesel Fuel	678	2000
S. Pump Station	Diesel Fuel	1055	2000
S. Pump Station	Diesel Fuel	126	2000
S. Pump Station	Oil	285	2000

TABLE 2

SECONDARY CONTAINMENT DRAIN RECORD

Date: _____ Time: _____

TANK IDENTIFICATION: _____

TYPE OF MATERIALS IN CONTAINMENT: _____

_____

VISIBLE OIL SHEEN (YES/NO): _____

Note: If visible oil sheen, do not discharge rainwater. Remove the oily material causing the sheen and place it in a container for disposal marked used oil. Then discharge the remaining water.

pH OF ACCUMULATED RAINWATER: _____

Note: If pH is less than 2.0 or greater than 9.0, do not discharge rainwater. Contact the Environmental Manager.

APPROXIMATE VOLUME: _____

DESTINATION OF DISCHARGE: _____

SIGNATURE: _____

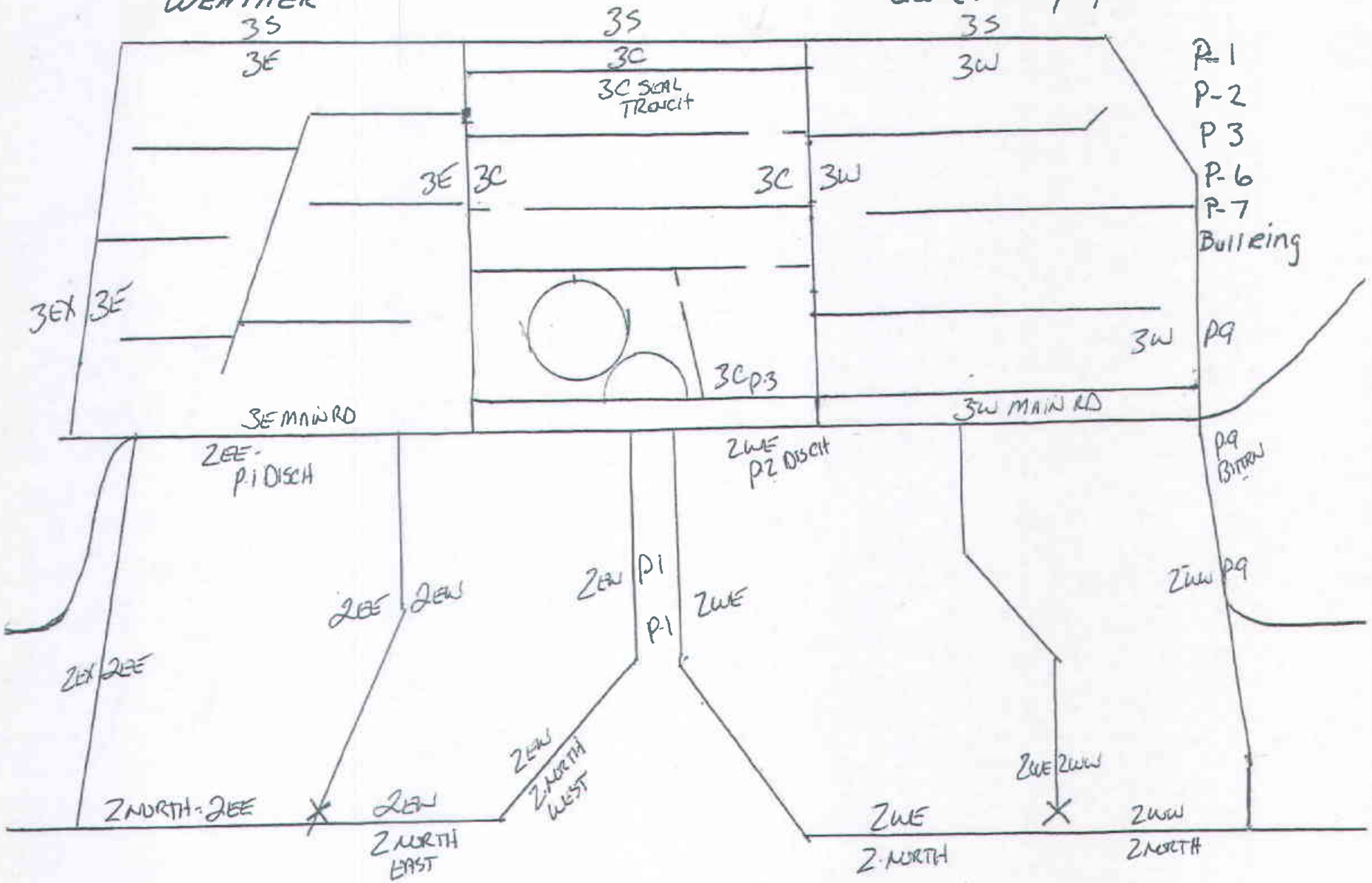
TABLE 3

SPCC TANK INSPECTION LOG SHEET

TANK DESCRIPTION	TANK CONTENTS	Visible tank and piping damage. Check for leaks, overflow protection integrity, and conditions of label. Date remarks
Bulk Storage	Fuel Oil	
Electrolytics	Fuel Oil	
Transformer	Transformer Oil	
Auto Shop	Fuel Oil	
Auto Shop	Fuel Oil	
Boron Plant	Decanol	
Boron Plant	Kerosene	
Boron Plant	Kerosene and Decanol	
P-0	Diesel Fuel	
P-0	Waste Oil	
P-9	Diesel Fuel	
P-10	Diesel Fuel	
P-10	Waste Oil	
P-11	Diesel Fuel	
P-11	Diesel Fuel	
S. Pump Station	Diesel Fuel	
S. Pump Station	Diesel Fuel	
S. Pump Station	Diesel Fuel	
S. Pump Station	Oil	
Signature of Inspector/Date of Inspection		

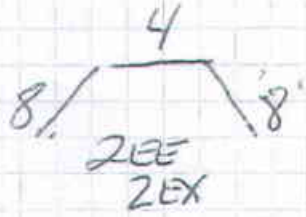
WEATHER

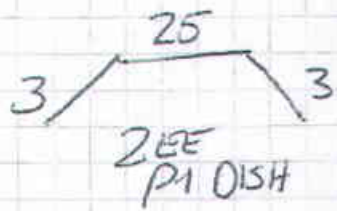
date: 1/12/11

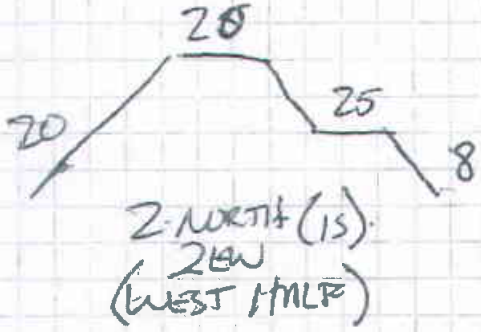


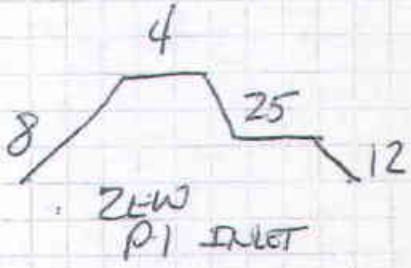
DIKE PROFILE LOCATIONS

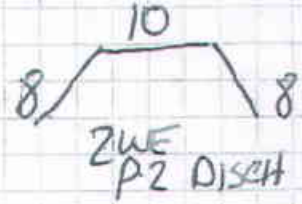
- 2-PONDS -

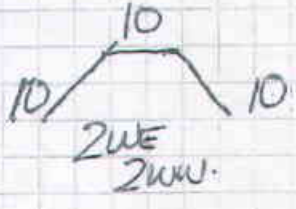


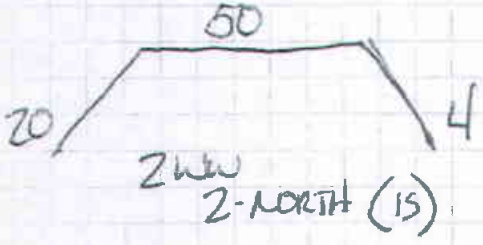


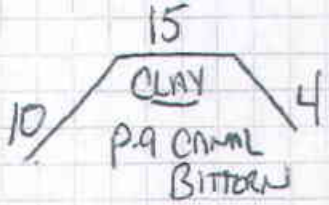






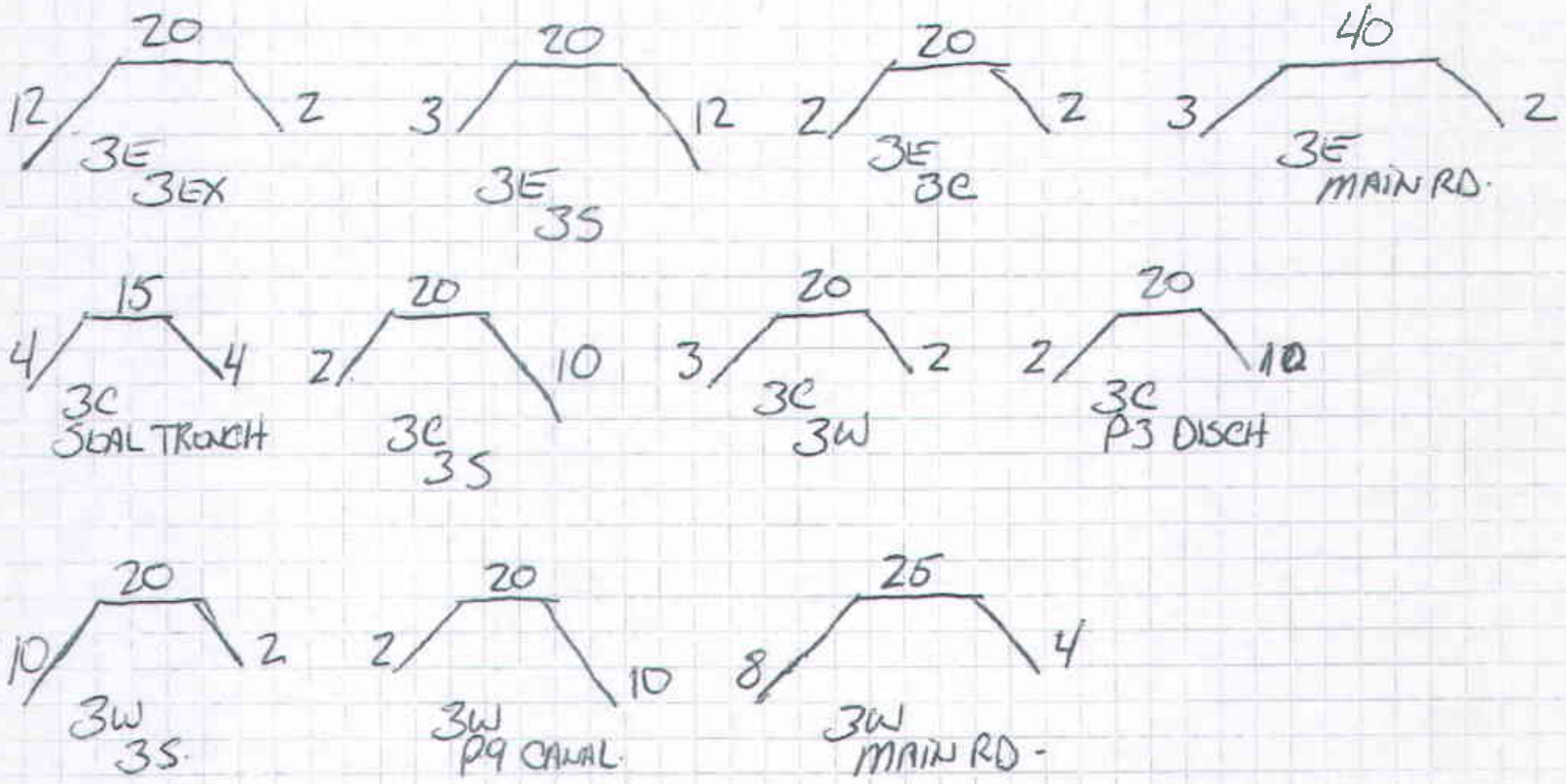






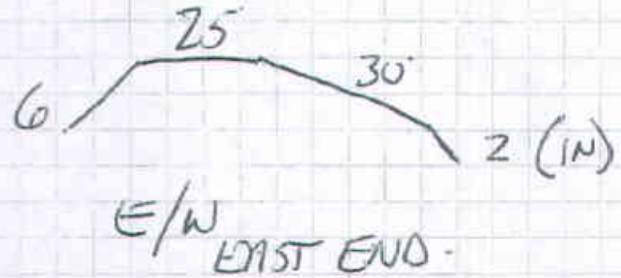
MAJORITY OF DIKES ARE 2-1 SLOPE —

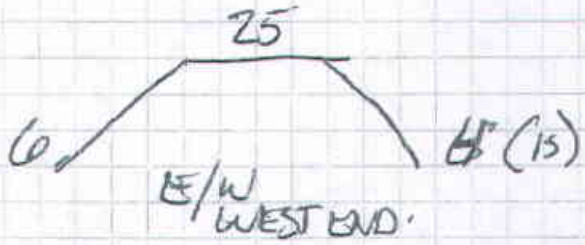
-3- PONDS -

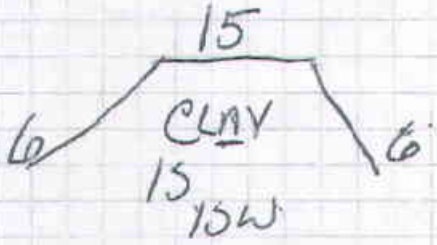


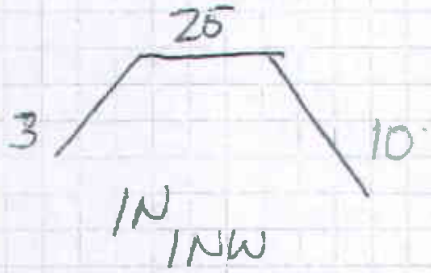
DIKES ARE 2-1 SLOPE.

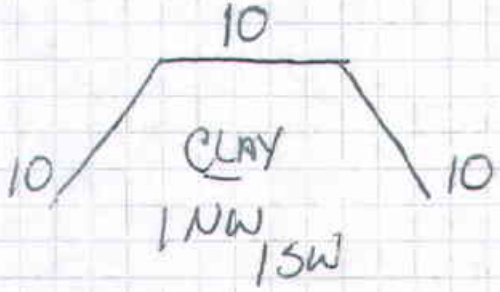
- EAST/WEST -


25
6
30
2 (IN)
E/W
EAST END.

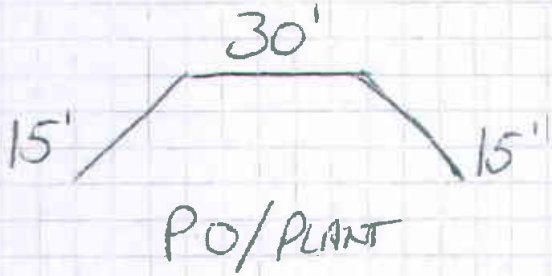

25
6
6 (IS)
E/W
WEST END.


15
6
CLAY
6
15
ISW

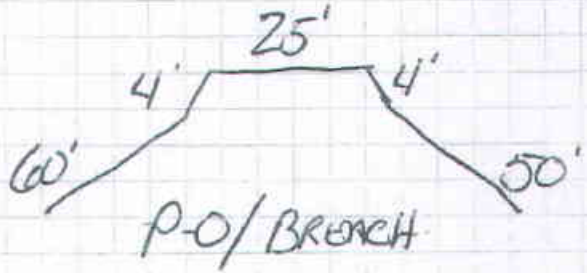

25
3
10
IN
INW


10
10
CLAY
10
INW
ISW

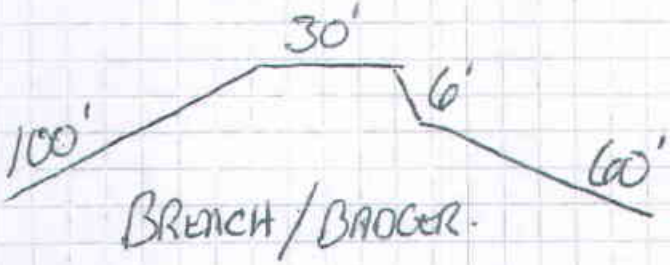
- NORTH DIKE -



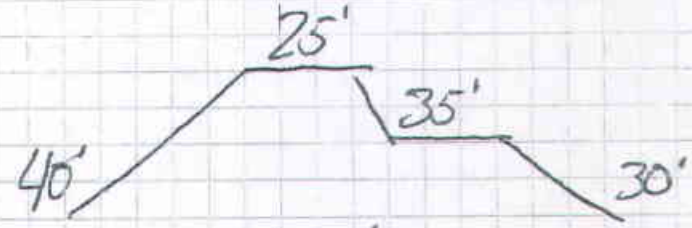
P O / PLANT



P-O / BRANCH



BRANCH / BADGER.



BADGER / HARBOR.